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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,475	10/28/2003	Ying Chen	ARC920030067US1	5009
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03/18/2008				
EXAMINER				
AHMED, ENAM				
ART UNIT		PAPER NUMBER		
2112				
MAIL DATE		DELIVERY MODE		
03/18/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/695,475

Applicant(s)

CHEN ET AL.

Examiner

ENAM AHMED

Art Unit

2112

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 14-20 and 22-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14-20 and 22-26 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Final Rejection

This office action is in response to applicants amendment of 1/10/08.

Claims 13, 21 and 27 have been cancelled.

Claims 1-12, 14-20 and 22-26 have been amended.

Claims 1-12, 14-20 and 22-26 are pending in this application.

Claims

1. Claim 16 objected to because of the following informalities:

Claim 16 is listed as being dependent on claim 13. However claim 13 is cancelled. At this time it will be assumed that claim 16 has dependency from claim 11 for examining purposes.

2. Appropriate correction is required.

Response to amendment

Applicants arguments have been fully considered, and are found persuasive only to the extent that prior art of record Dun et al. (U.S. Patent No. 6,112,255) teaches determining which data blocks have been updated recently, and updating the data blocks that have not been updated recently prior to updating the data blocks that have been updated recently (column 8, line 63 – column 9, line 23).

Response to applicants remarks

On page 9, the applicants state Wiencko does not teach determining which "codes" (which the Office Action asserts teaches the "computation" of the claimed invention) have been updated recently, and updating the "codes" that have not been updated recently prior to updating the "codes" that have been updated recently.

The Examiner agrees with the statement, however points out that prior art of record Dun et al. (U.S. Patent No. 6,112,255) teaches determining which codes have been updated recently, and updating the "codes" that have not been updated recently prior to updating the "codes" that have been updated recently (column 2, line 48 – column 3, line 3) and (column 1, lines 30-41).

On page 10, the applicants mention the Wiencko reference fails to teach or suggest "identifying data blocks that have not been updated recently relative to other data blocks of said data blocks that have been updated recently; [and] on a disk failure in said disk array, updating said computation ... and updating said data blocks, wherein said updating of said data blocks comprises updating said data blocks that have not been updated recently prior to updating said data blocks that have been updated recently".

The Examiner agrees with the statement, however points out that prior art of record Dun et al. (U.S. Patent No. 6,112,255) teaches "identifying data blocks that have not been updated recently relative to other data blocks of said data blocks that have been updated recently; [and] on a disk failure in said disk array, updating said computation ... and updating said data blocks, wherein said updating of said data blocks comprises updating said data blocks that have not been updated recently prior to updating said data blocks that have been updated recently" (column 2, line 48 – column 3, line 3), (column 1, lines 30-41) and (column 8, line 63 – column 9, line 23).

On page 16, the applicants mention Minow does not disclose determining which data blocks in the "main memory" have been updated recently, and updating the data blocks that have not been updated recently prior to updating the data blocks that have been updated recently.

The Examiner agrees with the statement, however points out that prior art of record Dunn et al. (U.S. Patent No. 6,112,255) teaches determining which data blocks in the "main memory" have been updated recently, and updating the data blocks that have not been updated recently prior to updating the data blocks that have been updated recently (column 8, line 63 – column 9, line 23).

On page 16, the applicants mention Sassamoto does not teach determining which data blocks in the disk array have been updated recently, and updating the data blocks that have not been updated recently prior to updating the data blocks that have been updated recently.

The Examiner agrees with the statement, however points out that prior art of record Dun et al. (U.S. Patent No. 6,112,255) teaches determining which data blocks in the disk array have been updated recently, and updating the data blocks that have not been updated recently prior to updating the data blocks that have been updated recently (column 8, line 63 – column 9, line 23).

35 U.S.C. 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11-12 and 14-16 are rejected under 35 U.S.C. 102(b) as being unpatentable over Dunn et al. (U.S. Patent No. 6,112,255).

With respect to claim 11, the Dunn et al. reference teaches periodically storing redundant data into data blocks located on a spare disk (column 2, lines 30-47); monitoring disks in said disk array for disk failures (column 6, lines 36-41); determining which of said data blocks contain altered redundant data, wherein said altered redundant data comprises at least a portion of said redundant data that has been altered subsequent to an immediate previous time said redundant data was stored (column 6, line 66 – column 7, line 15); recomputing said altered portions of said redundant data to produce recomputed altered portions and storing said recomputed altered portions in said data blocks (column 7, line 50 – column 8, line 32); updating said data blocks with altered redundant data when said disk failures have occurred (column 1, lines 30-41); identifying data blocks of said data blocks that have not been updated recently relative to other data blocks of said data blocks that have been updated recently (column 8, line 63 – column 9, line 23) and on a disk failure in said disk array, updating said data blocks, wherein said updating of said data blocks comprises updating said data blocks that have not been updated recently prior to updating said data blocks that have been updated recently (column 1, lines 30-41) and (column 2, line 48 – column 3, line 3).

With respect to claim 12, the Dunn et al. reference teaches wherein said disk failures that are predicted to occur (column 9, lines 41-44).

With respect to claim 14, the Dunn et al. reference teaches wherein said disk array comprises at least one a RAID array (column 1, lines 8-13).

With respect to claim 15, the Dunn et al. reference teaches comprising reconstructing data stored on a failed disk onto at least one replacement disk (column 3, lines 7-12).

With respect to claim 16, the Dunn et al. reference teaches wherein the steps of updating and deleting are skipped if said set of retrievable addresses exceeds a fraction of said data stored in said disk array (column 1, lines 30-58).

Claims 19-20 and 22-24 are rejected under 35 U.S.C. 102(b) as being unpatentable over Dunn et al. (U.S. Patent No. 6,112,255).

With respect to claim 19, the Dunn et al. reference teaches a monitor operable for monitoring the disks in the array for disk failures to occur (column 6, lines 36-41); a directory operable for determining which of said data blocks contain altered redundant data, wherein said altered redundant data comprises at least a portion of said redundant data that has been altered subsequent to an immediate previous time said redundant data was stored (column 6, line 66 – column 7, line 15); (column 8, lines 43-51); a computer operable for updating only portions of said redundant data that has been altered (column 5, lines 36-49); a controller operable for (column 2, lines 30-47); identifying data blocks of said data blocks that have not been updated recently relative to other data blocks of said data blocks that have been updated recently (column 8, line 63 – column 9, line 23) and updating said data blocks when said disk failures

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have occurred, wherein said updating of said data blocks comprises updating said data blocks that have not been updated recently prior to updating said data blocks that have been updated recently (column 1, lines 30-41) and (column 2, line 48 – column 3, line 3).

With respect to claims 20, the Dunn et al. reference teaches wherein said disk failures that are predicted to occur (column 9, lines 41-44).

With respect to claim 22, the Dunn et al. reference teaches at least one replacement disk operable for storing reconstructed data previously stored on a failed disk (column 3, lines 7-12).

With respect to claim 23, the Dunn et al. reference teaches wherein said directory is operable for marking the recomputed redundant data in said directory (column 9, lines 34-40).

With respect to claims 24, the Dunn et al. reference teaches wherein said disk array comprises at least one a RAID array (column 1, lines 8-13).

35 U.S.C. 103

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wiencko, Jr. et al. (U.S. Patent No. 6,557,123) in view of Dunn et al. (U.S. Patent No. 6,112,255).

With respect to claim 1, the Wiencko, Jr. et al. reference teaches writing a data block of said data blocks to be stored in said disk array (column 15, lines 47-48); combining an address of said data block with a set of retrievable addresses (column 15, lines 54-55); storing said computation on at least one spare disk (column 2, lines 10-11); deleting said set of retrievable addresses (column 8, lines 61-64). The Wiencko, Jr. et al. reference does not teach periodically computing a function of said data to be stored in said disk array to produce a computation, identifying data blocks of said data blocks that have not been updated recently relative to other data blocks of said data blocks that have been updated recently and on a disk failure in said disk array, updating said computation using said set of retrievable addresses to recompute only altered portions of said computation and updating said data blocks wherein said updating of said data blocks comprise updating said data blocks that have not been updated recently prior to updating said data blocks that have been updated recently. The Dunn et al. reference teaches periodically computing a function of said data to be stored in said disk array to produce a computation (column 2, line 48 – column 3, line 3); identifying data blocks of said data blocks that have not been updated recently relative to other data blocks of said data blocks that have been updated recently (column 8, line 63 – column 9, line 23) and on a disk failure in said disk array, updating said computation using said set of retrievable addresses to recompute only altered portions of said computation and updating said data blocks wherein said updating of said data blocks comprise updating said data blocks that have not been updated recently prior to updating said data blocks that have been updated recently (column 1, lines 30-41) and (column 2, line 48 – column 3, line 3).

With respect to claims 2, the Wiencko, Jr. et al. reference teaches wherein said disk failures that are predicted to occur (column 2, lines 51-61).

With respect to claim 3, the Wiencko, Jr. et al. reference teaches wherein said function comprises a mathematical function (column 14, lines 35-39).

With respect to claim 4, the Wiencko, Jr. et al. reference teaches wherein said function comprises an error correcting code (column 7, lines 1-4).

With respect to claim 5, the Wiencko, Jr. et al. reference teaches wherein said address of said data block comprises an address of a corresponding portion of the computed function and said set of retrievable addresses comprises a set of addresses that describe portions of the computed function requiring updating (column 36, lines 24-40).

With respect to claim 6, the Wiencko, Jr. et al. reference teaches wherein said disk array comprises at least one a RAID array (column 24, lines 16-34).

With respect to claim 7, the Wiencko, Jr. et al. reference teaches comprising reconstructing data stored on a failed disk onto at least one replacement disk (column 2, lines 10-11) and (column 6, lines 64-67).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wiencko, Jr. et al. (U.S. Patent No. 6,557,123), Dunn et al. (U.S. Patent No. 6,112,255) further in view of Minow et al. (U.S. Patent No. 6,021,462).

With respect to claim 8, all of the limitations of claim 1 have been addressed. The Wiencko, Jr. et al. does not teach wherein said steps of updating and deleting are skipped if said set or retrievable addresses exceeds a fraction of said data stored in said disk array. The Minow et al. reference teaches wherein said steps of updating and deleting are skipped if said set or retrievable addresses exceeds a fraction of said data stored in said disk array (column 6, lines 34-57) and (column 9, lines 23-34).

Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wiencko, Jr. et al. (U.S. Patent No. 6,557,123), Dunn et al. (U.S. Patent No. 6,112,255) in view of Sasamoto et al. (U.S. Patent No. 6,442,711).

With respect to claim 9, all of the limitations of claim 1 have been addressed. The Wiencko, Jr. et al. reference does not teach wherein altered portions of said computed function are updated whenever a load on said disk array is below a threshold value. The Sasamoto et al. reference teaches wherein altered portions of said computed function are updated whenever a load on said disk array is below a threshold value (column 1, lines 46-55). Thus it would have been obvious at the time of the invention was made to a person having ordinary skill in the art at the time of the invention was made to have combined the references Wiencko, Jr. et al. and Sasamoto et al. to incorporate wherein altered portions of

said computed function are updated whenever a load on said disk array is below a threshold value. The motivation for wherein altered portions of said computed function are updated whenever a load on said disk array is below a threshold value is for optimizing performance.

With respect to claim 10, all of the limitations of claim 1 have been addressed. The Wiencko, Jr. et al. reference does not teach wherein altered portions of said computed function that are less likely to be altered again are preferentially updated. The Sasamoto et al. reference teaches wherein altered portions of said computed function that are less likely to be altered again are preferentially updated (column 4, lines 33-39) and (column 6, lines 50-60). Thus it would have been obvious at the time of the invention was made to a person having ordinary skill in the art at the time of the invention was made to have combined the references Wiencko, Jr. et al. and Sasamoto et al. to incorporate wherein altered portions of said computed function that are less likely to be altered again are preferentially updated into the claimed invention. The motivation for wherein altered portions of said computed function that are less likely to be altered again are preferentially updated is for optimizing performance.

Claims 17-18 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (U.S. Patent No. 6,112,255) in view of Sasamoto et al. (U.S. Patent No. 6,442,711).

With respect to claims 17 and 25, all of the limitations of claims 12 and 19 have been addressed. The Dunn et al. reference does not teach wherein altered portions of said

computed function are updated whenever a load on said disk array is below a threshold value. The Sasamoto et al. reference teaches wherein altered portions of said computed function are updated whenever a load on said disk array is below a threshold value (column 1, lines 46-55). Thus it would have been obvious at the time of the invention was made to a person having ordinary skill in the art at the time of the invention was made to have combined the references Dunn et al. and Sasamoto et al. to incorporate wherein altered portions of said computed function are updated whenever a load on said disk array is below a threshold value. The motivation for wherein altered portions of said computed function are updated whenever a load on said disk array is below a threshold value is for optimizing performance.

With respect to claims 18 and 26, the Dunn et al. reference teaches wherein the altered portions of said computed function that are less likely to be altered again are preferentially updated (column 2, lines 11-29).

Conclusion

a. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Enam Ahmed whose telephone number is 571-270-1729. The examiner can normally be reached on Mon-Fri from 8:30 A.M. to 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacques Louis-Jacques, can be reached on 571-272-6962.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EA

3/7/08

/JACQUES H LOUIS-JACQUES/

Supervisory Patent Examiner, Art Unit 2112

